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1929 - 1930.



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# Proceedings and Reports . .

— of the —

Belfast Natural  
History and  
Philosophical  
Society.

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# PROCEEDINGS AND REPORTS

— OF THE —

## BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY

———FOR THE———

SESSION 1929-30.

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EDITED BY  
ARTHUR DEANE, F.R.S.E., M.R.I.A.,  
HON. SECRETARY.

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Belfast:

THE NORTHERN WHIG, LTD., COMMERCIAL BUILDINGS, BRIDGE STREET.

1931.



## BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

[ ESTABLISHED 1821. ]

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## CONSTITUTION.

The membership of the Society consists of Shareholders, Annual Subscribers and Honorary Members.

Shareholders holding more than two shares are not liable for an annual subscription, but shareholders of two shares pay an annual subscription of five shillings, and holders of one pay ten shillings.

In 1914 a new class of membership was created including persons of either sex, to be elected under the bye-laws of the Society, and admitted by the Council on payment of ten shillings per annum. Such members have all the privileges of the Society, and take part in any business of the Society not affecting the ownership of its property. In 1917 an Archæological Section was founded. Persons wishing to join the Section must be members of the Society and pay an additional minimum subscription of five shillings per annum.

A general meeting of Shareholders and Members is held annually to receive the Report of the Council and the Statement of Accounts for the preceding year ending 31st October, to elect members of Council, to replace those retiring by rotation or for other reasons and to transact any other business incidental to an Annual Meeting.

The Council elect from among their own number a President and other officers of the Society.

Each member has the right of personal attendance at the ordinary lectures of the Society, and the privilege of introducing two friends for admission to such.

Any further information required may be obtained from the Hon. Secretary, at 7 College Square North, Belfast.

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# BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.

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} Retire  
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THE VERY REV. W. P. CARMODY, M.A., M.R.I.A.

*\*Died during their Presidency.*

# Belfast Natural History and Philosophical Society.

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*Founded 5th June, 1821.*

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## Application Form for Membership.

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To be filled up by the Candidate	}	Name, etc. ....
		[Please write name in full.]
		Description .....
		Residence .....

....., being desirous of becoming a Member  
of the Society, I, the undersigned member, recommend.....  
as a suitable candidate for election.

Dated this.....day of....., 19....

Signature of .....  
Member

[Candidate must be known to the Member signing this form.]

[All applications are subject to the approval of the Council.]

Received ..... Elected by }  
Council }

## CONSTITUTION OF SOCIETY

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## ARCHÆOLOGICAL SECTION.

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Persons wishing to join the Archæological Section must be Members of the Society, and pay an additional minimum subscription of five shillings per annum. State below if you wish to join this section.

I desire to join the Archæological Section.

Signature {  
of  
Candidate {

.....

*[All applications for Membership to the Section are subject to the approval of the Archæological Committee.]*

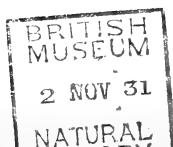
This form, when filled in, should be addressed to the

HON. SECRETARY,

B. N. H. & P. SOCIETY,

THE MUSEUM,

COLLEGE SQUARE N.



# PROCEEDINGS OF THE BELFAST NATURAL HISTORY AND PHILOSOPHICAL SOCIETY,

SESSION 1929 1930.

—O—

*26th November, 1929.*

## PRESIDENTIAL ADDRESS.

### “ THE ANCIENT MONUMENTS ACT, N.I., 1926, AND ITS WORKING.”

By THE VERY REV. W. P. CARMODY, M.A., M.R.I.A.,  
Dean of Down.

The passing of the Ancient Monuments Act, N.I., in 1926 marks a very important milestone in the history of Archæology in Northern Ireland. The full title of the Act is “ An Act to amend the law relating to Ancient Monuments, and to make provision for the preservation of objects of Archæological interest, and for other purposes connected therewith ”—thus it will be seen that the Act is an extension of former legislation.

It would seem that the first Act of Parliament dealing with Ancient Monuments was the Act which disestablished the Irish Church in 1869. Section 25 of this Act gave power to vest in the Commissioners of Works, Dublin, such ruinous Churches as were deserving of maintenance as National Monuments by reason of their architectural beauty or antiquity ; this Act also provided for their maintenance.

In 1882 the Act for the Protection of Ancient Monuments in the United Kingdom came into force. The owner of an Ancient Monument was empowered to make the Commissioners of Works guardians thereof, these Commissioners were bound to maintain the Monument to which they were to be allowed access for inspection. They were also empowered to purchase Ancient Monuments and to receive them by Deed or Will ; a definite punishment was provided for defacement ; provision was also made for the appointment and salaries of inspectors. In this Act there was no clear definition of an Ancient Monument, but

specimens were named, such as Navan Fort, the Giant's Ring, and Rathkeltair. Only eighteen were named, but the list might be extended by order in Council and similar Monuments included.

Then in 1892 an Act was specially passed for Ireland which empowered the Commissioners of Works to become guardians of any Ancient or Mediæval Structure whose preservation was, in the opinion of the Commissioners, a matter of public interest by reason of the historic, traditional, or artistic interest attaching thereto. This would seem to have been necessary, because without this definition the former Act only provided for the specified list and other Monuments added by the slow procedure of Order in Council. This Act of 1892 allowed the surplus of the moneys paid by the Commissioners of Church Temporalities to be applied towards the maintenance of ruinous Churches conveyed by the Disestablishment Act. This sum used to be about £1,000 a year, but was gradually diminishing, and at the time of the Treaty the amount allocated to Northern Ireland was quite insufficient for the upkeep of the Northern Monuments. The Irish Local Government Act of 1898, Section 37, gave the County Councils powers in respect to Ancient Monuments similar to those exercised by the Commissioners of Works.

The Land Act of 1903 allowed the Land Commissioners to reserve from the purchase operation and offer to the Commissioners of Works any Ancient Monument which they considered of sufficient public importance. If the Commissioners refuse it, it may be offered to the County Council, and if they also refuse the presumption is that the Monument will pass, together with the land on which it stands, to the purchasing tenant. This Act is still in force, but most of the others have been replaced by the Act of 1926.

It will be seen at once how this legislation required extension, and how necessary it was that fuller and stricter legislation should come; for it is sad to think of how great our loss has been because these laws came so late, and when they came were not strictly enforced.

I will mention some of the Ancient Monuments that we have lost for want of protection, and sorrowfully I must begin with my own town of Downpatrick. A little more than 100 years ago a fine Round Tower stood beside the

old Cathedral; it was taken down for some trivial reason and is gone for ever. I am sure public opinion at the time was against such sacrilegious vandalism, but there was no law to prevent it, and no court that had jurisdiction to punish the offenders.

Dr. Macalister tells us of a Monument that existed in the Parish of Killeavy, in County Armagh, which was almost the one and only Monument in North Western Europe that was of the same kind as the giant tombs of Sardinia and certain burial places in Sicily; so it was a Monument of European importance. There is not a vestige of it to be found to-day, the farmer in whose field it was cleared it all away; and all we know about it to-day is gathered from a few unsatisfactory pictures. Archæologists will lament its loss but it can never be replaced. "It's destruction," says Dr. Macalister, "was not only a national calamity, but a national disgrace."

Dr. Lloyd Praeger tells us in his own inimitable way how two Cromlechs were destroyed within three years in the south of County Down on the slope of the Mourne Mountains. (*Ulster Journal*, vol. IV, part 2, page 100.)

Up to the year 1786 there was in Mountstewart demesne a most interesting and unusual burial mound, 60 or 70 burial cists arranged round one bigger than the others, and all enclosed under a heap of stones; to-day one remains, the others are all gone.

At Greencastle, County Tyrone, there was at one time a unique Monument, a sort of dry stone wall surrounding a ring with a circular hollow in the middle; the wall was full of burial cists. It happened that one was discovered containing an urn which was sold for five shillings. Before long the whole Monument was torn in pieces. This I have from Dr. Macalister who, to his grief, saw it in ruins.

With my own eyes I have seen the shaft of a Celtic Cross doing lowly duty as a pillar to support an iron gate.

These are only a few examples of how our heritage of antiquity has been lost, and very great our loss has been, for the Ancient Monuments of a country are far more than objects of curiosity. They have a historical and a human interest. To the historian they are voices speaking from the past, they tell us, when we listen to them with intelligence and sympathy, how men in the past lived and worked; they reveal their thoughts, hopes and ideals; their primitive faith, imperfect and grotesque it sometimes

seems to us, yet to them it was something real that enabled them to endure life with its perplexities, and that faith expressed in some rude Monument can be studied to-day where the Monument survives; their domestic life can be recalled in potsherds and instruments of stone and bronze—strange to our minds that life must have been. “They dwelt,” said Aeschylus, “in hollowed holes like swarms of tiny ants in sunless depths of caverns”—yet that work and life of theirs lies at the basis of our present civilization, and their faith helped them till a brighter day arrived.

No historian who attempts to describe man's place in the world to-day can afford to ignore this early history. The giant ships growing beneath the gantries of Belfast in all their strength and beauty have for their ancestors the hollowed oak boats that are found from time to time submerged in lake or river beds. The delicate linen work produced by the power loom has for its ancestor the coarse material produced by the spindle and whorl. The treasures of the Art Galleries of Europe must acknowledge and need not be ashamed of their Magdalenian forefathers.

Our new Municipal Museum has been recently opened in Belfast. We are justly proud of it, for in the variety of its exhibits, and in their classification, it cannot be excelled. It contains unrivalled material for the study of the past. Let us hope that it will never be regarded by any citizen of Belfast as a collection of curiosities, but as one of the foremost of our Educational Institutions.

Then, if you come to a later period, you have in Northern Ireland the remains of Churches and Abbeys which tell of the places where men of our own race worshipped God in days long past and found that peace which the disturbed world around them failed to bring.

We have Norman Castles and Plantation Bawns telling, if we enquire of them, something of the history of our country as it was hundreds of years ago. These remains, when understood, clothe the dry bones of history with life. We will never educate our children, nor create in them the pride that will make them say, “This is my own, my native land,” till we bring them to see the meaning and significance of these things. Until recent years, history was excluded from the syllabus of our primary schools. Let us hope that in the near future children will be brought to these Monuments and told by the teachers their meaning and history.



It is well, then, that we now have an Act of Parliament that furnishes a procedure to check the destruction of such Monuments and ensure their preservation.

I will now go through the Act of 1926 and show what its provisions are:—

The owner of any Ancient Monument may by Deed appoint the Ministry of Finance, with its consent, as guardian of the Monument. This does not mean that the owner necessarily parts with possession of it, but it includes the obligation of the Ministry of Finance to preserve and maintain the Monument. The Ministry may purchase the Monument or accept a gift of it if it be found expedient to do so.

For the working of the Act it is provided that an Advisory Committee be appointed, which has no executive powers, but, as its name implies, exists for giving advice to the Ministry on the subject of Ancient Monuments. This Committee has, as one of its duties, to prepare, from time to time, lists of Ancient Monuments, the preservation of which is of national importance, and when the Ministry have accepted such lists they will notify the owners of the penalties which may be incurred by any person guilty of such an offence as demolishing, or removing in whole or part, or making excavations in the neighbourhood of the Monument, and this penalty may be a fine not exceeding £100 or imprisonment for a term not exceeding three months. This provision should secure a Monument thus scheduled against damage by anyone other than the owner, and oblige even an owner to give notice to the Ministry of his intention to take action affecting the Monument, giving time for special measures, if thought necessary.

The Advisory Committee has for some time been engaged in making these lists, and four of the six counties have been wholly or in part investigated.

If the Advisory Committee report to the Ministry that any Monument is in danger, the Ministry have power to make an order placing the Monument under their protection, but if there be immediate danger they can make that order without a report from the Advisory Committee. While this Preservation Order is in force the Monument to which it refers cannot be removed or demolished, nor any additions or alterations made without the written con-

sent of the Ministry; further, if it be found that owing to any neglect of the owners the Monument is liable to fall into decay, the Ministry have power to appoint themselves guardians, and use full power as if it had been conveyed to them by a Deed.

When the Ministry or County Council is the owner or guardian of an Ancient Monument any person who injures or defaces it shall, on conviction, be liable to a fine not exceeding £5, and in addition to the fine may be called upon to pay damages, or he may be imprisoned for a term not exceeding one month.

But the Act is careful not to interfere with private property, and where it has to be done the Ministry will pay compensation.

The Ministry may receive voluntary contributions towards the cost and maintenance of any Monument vested in them.

Where the County Council is the guardian of any Ancient Monument it may, with the consent of the owner of the Monument, transfer the guardianship to the Ministry of Finance.

With certain provisions the public shall have access to any Monument which is vested in the Ministry of Finance, or vested in a County Council of which the Ministry or County Council is guardian.

Funds are provided by Parliament annually for such expenses as may be incurred by the Ministry of Finance in this work. The present provision, I may say, is £1,000.

The Ministry of Finance is authorized to give advice with reference to the treatment of any Ancient Monument.

They may also superintend any work in connection with any Ancient Monument, if invited to do so by the owner, and are responsible for any work done to any Monument which is under their protection by a Preservation Order.

They have also power to prevent the desecration of any Monument by the display of advertisements.

All ecclesiastical buildings, when in use as such, are excluded from the powers given under this Act.

Another very important provision is that the finder of any Archæological object must, within fourteen days of finding, make a report of it to the Advisory Committee.

Should he fail to do so, he is liable to a fine not exceeding £5, or to imprisonment for a term not exceeding one month. This does not mean that the Advisory Committee will in any way claim the find, but they must have information about it, and may recommend its purchase if thought desirable.

A Bill is now before the Free State Parliament similar to our Ancient Monuments Act, which contains a provision that we have not got, namely, it forbids the sale or export of any Archæological object without a licence from the Ministry of Education, otherwise the offender may be fined £50 or suffer imprisonment for a term not exceeding six months.

Broadly speaking, these are the provisions of the Ancient Monuments Act. It must not be inferred that it forbids or discourages private enterprise, nor does it discourage Archæological research by other Societies or Committees, but it implies that such work should not be carried on without the knowledge of, or independent of, the Advisory Committee, which is a body of experts partly selected by the learned institutions and societies operating in the province and partly chosen for local knowledge. Our own Society nominates a representative. The Ministry of Finance is ready at all times to give the benefit of the advice of their Architect and to superintend the work free of charge, save for out-of-pocket expenses, where the cost of the work of preservation is met by such Society or Committee.

With this Act of Parliament on the Statute Book, and with an Advisory Committee in being, no Archæological Work should be undertaken without consultation with them. This is what was done by the Down and Connor Archæological Society at Struell, and by the Committee in charge of the work at White Island.

It should always be remembered that the investigation of an Archæological Site should only be undertaken by those who have scientific knowledge and special training for the work. The Free State Bill goes so far as to forbid excavation except with Government Licence.

I have already spoken of Monuments that have been completely demolished, but that is not the only danger, for Monuments and Sites have been deprived of all scientific value to Archæology because they have not been wisely in-

vestigated. I will quote one example: At Lisnacroghera, Co. Antrim, there was one of the most important Crannogs in Ireland, probably the most important. In it were found a wonderful number of implements, many of them with La Tène ornamentation. They were carefully collected and preserved, some of them can be seen in our Museum in Belfast; but this was all; its stratification would have been of the greatest importance for elucidating a very obscure period of Irish History, the end of the Pagan Iron Age and the beginning of Christianity. This was not done, and the lessons which might have been learned were lost. Things like this have happened more than once. There is always the danger that the collector may increase his store at the expense of history. Amateur investigation of Archæological Sites is to be discouraged. Archæology is not a matter of making collections. There must be a careful study of the sites where these things are found and a correlating of them with other sites and other objects, not only with those found in Ireland but in other countries, so that by building up of ascertained facts knowledge will increase and history will not grow on the insecure foundation of fanciful hypothesis but on the solid rock of Truth.

I will now refer to the work which has been done by the Ministry of Finance since the first meeting of the Advisory Committee on the 28th January, 1926. Amongst the Monuments now vested in the Ministry of Finance are Carrickfergus Castle, Dunluce Castle, Jordan's Castle, Ardglass, Inch Abbey and Grey Abbey. The two Cistercian Abbeys were taken over from the Board of Works—the others have been acquired by the Ministry.

Let anyone who knew Dunluce as it was some years ago see what it is now. It was then a confused mass of ruins. Now the rubbish has been cleared away. You can walk about and, with a little imagination, reconstruct the life of those who lived there hundreds of years ago. The same, to some extent, has been done for the less ruined Castle of Carrickfergus. There are other places where decay and desecration have been arrested, such as Devenish, Dungiven, Maghera, and the Church at St. John's Point, Co. Down.

Aerial photography on a systematic basis for the elucidation of Archæological problems in Northern Ireland

was proposed by the Ancient Monuments Advisory Committee at its meeting in April, 1927, at the suggestion of the Rev. L. P. Murray. With the permission of the Air Ministry, No. 502 Ulster Bombing Squadron, stationed at Aldergrove, co-operated and most useful work has been done.

At first buildings were photographed with the hope that the outline of vanished structures might be revealed as in the case of Antrim and Maghera Round Towers, where the existence of a Church near the Round Tower has long been surmised but never proved. However, it was found that no very striking results were then achieved. At Antrim, for instance, a good aerial photograph was not possible on account of the presence of trees. The airmen themselves, however, pointed out the extraordinary clarity with which ancient earthworks of the rath type could be seen from the air, and added that many which they could distinctly see were not marked as such on ordnance survey maps. Accordingly attention was directed to this side of the work, and in particular to the great fort at Navan, Co. Armagh, the large irregular entrenchment known as the Dorsey, lying on the main road between Armagh and Dundalk, and the Dane's Cast, a "travelling entrenchment" on the boundary between the Counties of Down and Armagh.

At Navan the results were not very remarkable. It had been hoped that outlying tracks would be found as at Stonehenge. The Dorsey was traced completely, and some light thrown on the vexed question of whether it continued to east or west. Some addition was made to the known extent of the Dane's Cast, but no continuation of it north beyond Scarva or south beyond Meigh was found. However, the airmen were able, partly by observation, partly by photography, to mark its outline completely on the ordnance maps.

Finally, the airmen made a systematic study of the district lying between Massereene Deer Park, Langford Lodge and their own aerodrome. A large mosaic or composite photograph has been made in this case as in that of Navan and the Dorsey. Its study will take some time and may result in interesting discoveries. Certainly air photography has disclosed the site of earthworks in many places where their existence was unsuspected, and has

shown pretty conclusively that these enclosures were in many places as thick as modern farms, and in many cases could not have been forts, but rather defensible dwellings.

Now every Act of Parliament has to depend for the success of its work on the goodwill and co-operation of the people for whom it is made, and we look forward with confidence to the co-operation of the people of Northern Ireland, so that our Ancient Monuments will be preserved for the future, and treasured as part of our National inheritance.

"Ireland must remember," says Dr. Macalister, "that she holds in trust for Europe a large number of Ancient Monuments of unique importance, and whatever legal right the possession of a Deed may convey it surely conveys no moral right to the man who for a few years is in occupation of a piece of land to deprive all future generations of the privilege of enjoying or profiting by an Ancient Monument by removing, destroying, selling, or otherwise disposing of it."

These words give a solid reason why the Ancient Monuments Act is necessary. We are thankful for the good work which has been done for years by the Archæological Societies which is now being recognized and helped by the Government, and appeal for further co-operation.

Let it not be thought for a moment that the Archæology of Ireland is all known, and that nothing remains but classification; on the contrary, we are only at the beginning. There are still large and wide fields for exploration. Only last year the remains of Palæolithic man were found at Kilgreany, Co. Waterford—a new discovery for Ireland, but one which opens a great vision, and is a stimulus to all zealous workers.

I am sure I will not appeal in vain to the members of this historic Society to aid the Ministry in the working of the Ancient Monuments Act.

---

[The President intimated that he had received valuable help from Dr. Chart, Deputy Keeper of Records, N.I., and Dr. Macalister, President of The Royal Irish Academy.]

*11th February, 1930.*

The Very Rev. W. P. Carmody, M.A., M.R.I.A., President,  
in the Chair.

MR. A. M'I. CLELAND.

“THREE ENGLISH SAINTS AND THEIR SHRINES;  
DURHAM, ELY, AND CANTERBURY.”

In his opening remarks the lecturer pointed out that the three Cathedrals of Durham, Ely, and Canterbury offered great contrasts both in their situations and styles of architecture, and more so in the lives and characters of their tutelary saints.

St. Cuthbert's life was briefly sketched, with a detailed account of the many years' wanderings of his remains till they found a resting-place at Durham. The saintliness of St. Cuthbert's character was dwelt upon, and also his life as a hermit on the lonely Isle of Lindesfarne.

St. Etheldreda of Ely was a woman as remarkable as any woman of which English history had taken note. She refused the honours due to a king's daughter and rejected wedded life for her work among the humble people of the Fens. Though she married twice—for political purposes—she kept her virginal vows. Born in 630, she founded Ely in 673 and died in 679, a virgin, queen, and abbess.

The character of St. Thomas of Canterbury stands out in vivid contrast with the characters of Cuthbert and Etheldreda. St. Thomas a'Becket (St. Thomas of Canterbury) lacked nearly every attribute except brute courage. He was not free from love of self, and he had a passionate nature and a bitter tongue. Yet his shrine at one time had a European reputation, an honour denied any other English Saint. The lecturer briefly sketched the story of Becket's "Martyrdom" and gave an interesting account of the numerous relics at one time to be seen at Canterbury, with details of the many miracles associated with a "Canterbury Pilgrimage."

At the conclusion of the lecture a very fine series of lantern views were shown. These the lecturer explained in detail, thus bringing out the strong architectural contrasts between these three fine cathedrals.

11th March, 1930.

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The Very Rev. W. P. Carmody, M.A., M.R.I.A., President,  
in the Chair.

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COLONEL R. G. BERRY, J.P., M.R.I.A.

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“ CELTIC MOTHER GODDESS.”

Illustrated by Lantern Slides.

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The Irish Mother Goddess is probably of Mediterranean origin, but she more closely resembles the Phrygian Cybele or the Syrian Astarte than she does the Roman Ceres or the Egyptian Isis, but like Isis she is the “Lady of a Thousand Names.” The Irish themselves frankly described her as an *arrach*, i.e., a spectre, a phantom, a ghost, or a spirit.

In Gaul and Britain we meet the Celtic Goddess under the form of the *Dea Matres*. This was a Roman designation, what was the native we do not know, but the Romans recognised that she was a *numen* and called her a *genius* as well as most of her attendant gods. In Britain she had a variety of names and several distinct personalities, but here as well as in Ireland she appears to have been a spirit who took different local forms and tribal names. As a spirit she is properly described as “The Grey One.” Both the ancient Irish and the ancient Britons used the word *glas* to describe her. *Glas* is a word of many and illusive meanings, as a colour it is more or less invisible, it is the colour that spectres should be, it is the grey or blue of the air and the blue or green of water. This spectral form is the mother of the Celtic gods and she haunts or inhabits a tree, a stone, or a well, and her dwelling is on headlands, where we find those *suide* or thrones which are her seats. It takes a combination of a well, a tree, and a hill to make her holy place, and it is for that reason that Glastonbury, with its Chalice Well, Tor Hill, and Glastonbury Thorn, was one of her most sacred places and eventually became identified with the other world, in its name of *Avallon*. Similar holy places are fairly common in Ireland.



Being a spirit, she takes animal as well as human form. We find her as *Babdh*, a black bird or grey-backed crow or raven, she is the grey wolf of the forest, a red-eared heifer, or an eel, or a serpent. She inhabits wells, rivers, inland waters, and the sea, where she is known as the *sinnech*, and it is she that causes the roaring of Tonn Rury in Dundrum Bay. In Lough Neagh she is Liban, who is also known as Muirgelt, i.e., sea-born, and is but the Irish form of the Welsh Morgan. She appears in the form of a horse rising out of the waters when she is known as a "*pookah*," and when in the form of a hound she is called "*darrachu*," i.e., the phantom hound. In human form she is still a wraith, her comings and goings are illusive, she is the Errant Maiden of the Fianna Saga and of the Arthurian Legends, sometimes she appears as the Loathely Maiden, a gigantic, ugly hag, to others she comes as the "fairest of the fair," but she holds the part just for that space of time that is needed to accomplish her object. She is an *Amaid*, a foolish woman, she is also the Calliagh Bera who sits on the Hag's Chair and has houses at Lough Crew and Slieve Gullion. In Christian times she got her name changed by baptism to Vera and she died a nun in the full odour of sanctity.

Like all other Celtic gods, she conformed to the triadic system, and we find her name occurring more or less in triads, thus as Mother of the Gods she is known as Anu—Ana—Buananan, as war-spirit she is Badbh—Macha—Morrighu, the Great Queen, and in this capacity, but probably more localised, we find her as Macha—Fea—Nemon. As the spirit of the land of Ireland she is Eriu—Banbha—Fotla.

She was represented on earth by certain divine or semi-divine personages who seem to have also been historical characters, thus she was Roy—Nessa—Dechtire, and, possibly, Etain, all of whom were queens, chieftainesses, and tribal mothers.

Tuesday, 25th March, 1930.

The Very Rev. W. P. Carmody, M.A., M.R.I.A., President,  
in the Chair.

“ DISTRIBUTION OF INSECTS IN IRELAND.”

REV. CANON FOSTER, M.A.

“ The Distribution of Insects in Ireland.” This title, I fear, is rather an aspiration than the results of actual investigation; it would indeed be ideal to be able to come before you to-night with full knowledge of how insects are distributed in the provinces and counties of Ireland. But there are only a few counties of Ireland that I have found time and opportunity to explore, Down and Armagh, Wicklow, Kerry, and less thoroughly a few others. However, it has seemed to me most extraordinary or almost inexplicable the way in which butterflies and moths are distributed in this country. I say butterflies and moths, for that is the special brand of insect life I wish to deal with. To take a few examples of this mysterious distribution. How can we explain the presence in Connemara of the two moths *Zelleria phillyrella* and *Platyptilia tesseradactyla*, and yet they occur nowhere else in the British Isles? Why is it that *Dianthecia capsophila* is to be found on patches of Sea Campion everywhere all around the Irish coasts, and also on the Isle of Man littoral? Yet it does not occur in Great Britain. There its place among the Campion is taken by its cousin *carpophaga*, which, again, has not come over to Ireland. But when we pass across to the Continent we find both species to occur, the Irish *capsophila* on the mountains, the English *carpophaga* generally on the lowlands. How, then, has *capsophila* managed to evade England altogether, and why even in Ireland has it confined itself to the sea coast, avoiding with us the inland mountains entirely? At Benderg Bay, near Ballyhornan, there is a solitary bee living in a huge colony in burrows on the face of the cliff. It is very abundant throughout a stretch of cliff about 200 yards in extent. Then it disappears, and to find it again you must travel to the County Wexford. These are the only two places in Ireland where as yet, at any rate, it has been

found, though its cousins are abundant all along the coast. So, too, there is the moth *Dianthecia luteago* which occurs here and there on the coast of Ireland from Howth to Cork, and in England from S. Wales to Cornwall, and yet does not occur again till you cross over to Central and Southern Europe. At Ballycastle, Co. Antrim, you may find in the sandhills *Nyssia zonaria*, but you will not meet with it in Ireland again unless you visit County Mayo. In Scotland you find it in the Hebrides and in England on the Cheshire coast. On the Continent you find it in Sweden, Central, but not Western Europe, and thence down to the Alps and Southern Russia. Why is all Eastern Britain, France, and Holland skipped out by the insect? Last September I spent the early part of the night in the sandhills near Newcastle examining the Heather blossom by lamplight for the moths that came to feed upon it. In extraordinary abundance there was a very handsome moth, *Anchocelis helvola* L. Yet I only once saw it before, and that was on the flower of a Ragweed at Dalmally, Argyleshire, and there are only about 12 isolated Irish records, while it is one of the common English moths. In the N. of Co. Clare there is the so-called Burren district, very famous for its botanical features. It consists of sheets of bare limestones split up by deep fissures, within which abound such plants as *Dryas octopetala* and the Maidenhair fern; it is also, with S. Galway, the one locality in Ireland for the Burnet Moth, *Zygaena purpuralis*, which elsewhere in the British Isles is only found at Oban and Lough Etive in Scotland and one locality in Wales. Clare and Galway, Wales and Western Scotland, does there not seem something very strange about this isolated distribution? Such, then, are some of the mysteries that strike one who devotes his spare time to the ways and habits of these insects.

Very often island fauna and flora are noticeable for the number of endemic species that occur; an island is apt to show species that occur there and there alone. So is it with New Zealand, Sardinia and Corsica, and the Galapagos. Especially is this the case with oceanic islands which are far removed from a continent and have remained isolated for long geological periods. There has been time for new species to arise; and, further, the isolation may have preserved alive species that have died out, or have developed on other lines upon the continent of which long ages past

the island was a part and from which it originally derived its fauna. But this is not the case with islands close to a continent and to which they have been united in recent times. There the fauna will be somewhat similar to the mainland, nor will it have had time to develop new species. Unlike such oceanic islands as New Zealand, the Galapagos, or even Sardinia and Corsica, I cannot point to any species of lepidoptera peculiar to Ireland; with but a very few exceptions they are all to be found in Great Britain, or on the Continent at any rate. We may conclude, therefore, that Ireland has received its fauna as a whole from Great Britain, and this fauna belongs to the Palæarctic division of the world's fauna, nor have we any evidence to hold that Ireland has been the centre of origin for any species from whence it radiated out to other lands.

Fishing one day in the Co. Kerry, I landed a trout, and on going to inspect the capture I noticed growing close at hand the Blue-eyed Grass, *Sisyrinchium angustifolium*. Another fishing expedition took me up one very hot day to Lough Acumen in the Dingle peninsula. I heard some water dripping down a cliff through what seemed a hanging mass of moss, and I went to refresh my thirst, but what was my surprise to find the seeming moss was really *Sibthorpia Europaea*, which also grows in masses beside the roadside high up Conner Pass on the way to Dingle. A year or two later I was crossing a hill in Brittany and I happened to look at the side of the ditch along the road, and to my surprise I found that it was covered with my Kerry friend *Sibthorpia Europaea*. These two plants represent, of course, the first the N. American flora to be found in Ireland mostly in the west, and the second the so-called lusitanian flora. *Sibthorpia* also occurs in Cornwall, but such other lusitanian representatives as the Giant Butterwort, the Arbutus, the Mediterranean Heath of Connemara, are only to be found in Ireland and in S.W. Europe. The Lepidoptera do not show such remarkable examples of distribution as is to be seen in these plants, yet for all that we do find evidence for an invasion of Ireland both from the north and also from the south, and each of these invasions has left numerous colonies, especially in the West of Ireland. Indeed, were it not that geologists tell us it is impossible, the easiest explanation of the facts would be to assume that Ireland received these two migrations one from the north and the

other from the south, passing along some submerged land connections and that Ireland was occupied by them successively, while during the ice age they took refuge on an Atlantic ledge now submerged, whence they returned eastward with inter-glacial or sub-glacial periods. But next there came a direct invasion from England and the east, with the result that they were driven to take refuge again in the woods and seaboard of the west. So, too, were the old Iberian or Mediterranean peoples driven out of Eastern and Central Ireland to take refuge in the Western Mountains with the crossing of the Celts four centuries B.C. The curious result has been that just as you find in Kerry or Clare, arctic and lusitanian plants such as the so-called Killarney Fern and the *Arbutus* on the one hand and on the other *Dryas octopetala* or *Sisyrinchium* growing close at hand, so, too, will you find the White Prominent, *N. bicolor* with its delicate southern look, in the birch woods, while a mile or two off among the cliffs you meet with *D. capsophila*, a denizen of alpine or arctic peaks. I have made a rough calculation of the number of species belonging to the so-called macrolepidoptera which have occurred in the five counties where I have mostly worked with, in addition to that of Galway. The results seem interesting. Armagh and Antrim both give 262, Down is 308, Tyrone 353, Wicklow rises to 359, Kerry has 382, while Galway heads the list with 451. It is due to this survival in Kerry and Galway of the old arctic-alpine and the lusitanian colonies that make the totals of these counties in excess of the rest. Otherwise you would expect Wicklow to be supreme, for it is a far more promising county than Kerry. A large part of Kerry is bleak, bare mountain or water-logged dug-out bog. Very little of the old forest is left and even the scrub is gone. Near Waterville I was crossing a bog and a native leaned over on his spade and gave me the time of day. He said he was preparing the land for turnips, though where the turnips were to grow I could not make out; there was nothing to be seen but water and rushes and rock and white earth. He told me that three deep banks of peat had already been cut out of that bog. No wonder I found it disappointing as a hunting ground. It is, however, in the Caragh—Killarney—Kenmare district where the old birch and oak still survive that any minute of the day you may make some wonderful discovery and add something new to the fauna

of Ireland. But Wicklow is full of the remains of the old oak woods and the native birch trees are everywhere. Then its rainfall is less than that of the west and there is far more sunshine. Yet Wicklow shows only 359 against the 382 of Kerry and the 451 of Galway. Perhaps, then, the explanation is that these two counties possess in addition to the lepidoptera common to all Ireland the northern and lusitanian migrants and survivals. Yet the Wicklow moths and butterflies show distinguishing features. There are a fair number which seem to have their headquarters there, and scarcely extend to the west. Though Wicklow be weak in northern and southern elements yet it has an eastern element of its own, which is almost wanting altogether in the western counties.

As regards this south-eastern group I should like to quote Mr. Arthur Stelfox. "The older writers were obsessed by the animals and plants of the W. and S.W. and overlooked the equally clearly marked off fauna and flora of the S.E., in which insects figure very largely. This group varies in its range from species with a single station to ones with a range along E. coast to Down and along S. coast to Cork and Kerry, but they are mostly things that need sun and sand. You will find this group mentioned in my Hymenoptera-aculeata list, and if you want other examples you can add 3 Hemiptera, one of which ranges along Wicklow coast between Arklow and Wicklow, another from Kilcool to Wexford, and the third from Wicklow to Roscarbery in Co. Cork." I may say that it was Arthur Stelfox and Balfour-Browne who first discovered this S.E. group; Balfour-Browne elaborated it with county diagrams in his report on Water Beetles made for the Clare Island survey. To it must be referred those insects I have already mentioned, the bee *Colletes daviesanus*, Wexford and Co. Down, and the moth *Dianthecia luteago* along the S.E. coast from Howth southwards. To this invasion, apparently, is due the high number of species in Co. Down as compared with Antrim and Armagh, for the Mourne Mountain district, especially Rostrevor and Newcastle, have afforded there shelter and a milder climate than the rest of the Co. Down. Mr. Stelfox thinks this group must point to some recent kind of connection with Great Britain. At any rate you have *D. luteago*, var. occurring only on the S.W. coast of England and the S.E. coast of Ireland, and *Anchocelis*

*rufina* (*heliola*) along the E. coast and so abundant at Newcastle, Co. Down. What is the origin of this eastern group? It seems to be a late invasion of Ireland, and perhaps this occurred during the period which Clement Reid describes in his submerged forests. The North Sea from southern Yorkshire and to a point south of the Straits of Dover was then united to the Continent. The submergence, he considers, took place about 5,000 or 3,000 B.C. Judging from the evidence afforded by buried beaches and the Dogger Bank a sort of damp fen land stretched across from Norfolk to Holland. Across these fens passed many insects from Holland, all fen insects, and they now survive in the fen district of England. There was, for example, the Large Copper butterfly, *dispar*, as the English variety is called, now extinct. The curious thing is that there has recently been discovered in Holland a variety of the Continental Copper which closely resembles the English *dispar*, so it would seem that it was the Holland form that passed over these fens now submerged and held its ground till recent years in the English fens. Then there is the Swallowtail butterfly and a large number of moths belonging to the genus *Leucanidæ*, which feed inside the stems of reeds and rushes. But these were all fen insects and did not pass outside the fens. They would have passed across during the submerged forest period, but found no fens to feed among farther west. According, they still remain there and never reached Ireland, although much of this country would appear very suitable for them as a habitat. But between Dover and Calais the land was higher, where the passage has been cut between the chalk of Kent and France to let the water of the N. Sea pass down into the English Channel. Along this line perhaps this eastern group came and, as Mr. Stelfox would suggest, found some similar land connection between the S. of England and the S. of Ireland. And there along the E. coast they still remain. For it is just as hard for an insect emigrant to find a new home in a fully occupied country as it is for a human immigrant. The latter finds all the jobs filled up, and the former finds all the plants occupied, too, by the native fauna. The plants would perish did further insects in the caterpillar stage try to feed upon them. Nature then would intervene in order to preserve her balance with an increase of ichneumon wasps to keep down the sudden increase. So insects spread just as slowly in an occupied

country as do plants. It has been calculated that it would take a plant species a million years to travel from London to the Shetlands, or to Dresden or the Pyrenees, through occupied country. But plants, and with them the insects, spread very quickly over new territory just as the slowly emerging North Sea would have been. As the land rose the plants moved on and after them came the insects, till at last England was reached. So, too, after the ice age passed and milder climate came, there must have been a great migration to seize upon the newly opened country. It is change of climate and the emergence of new lands that produce migrations. This S.E. group of insects is of a very mixed class, containing representatives of the various classes, Arctic, Alpine, Oriental, Lusitanian, Serbian, and Germanic. It might be pointed out that the lepidoptera are of very ancient origin, going back to the Cretaceous and Jurassic ages of the Secondary Period. All our insects, or at any rate each ancestral species, was evolved on the old Polar continent which occupied N. America, the present N. Atlantic, and Northern Europe and Asia. For a large percentage of Palæarctic insects are also Nearctic and would date back to the time when there was one Polar continent possessing a temperate climate at the very least. Then the N. Atlantic continent sunk, leaving but such relics as Greenland, Iceland, the Faroes, bits of Ireland and Scotland, and Scandinavia. In America the insects could take refuge in the south and then push back northwards as the climate moderated. But most of north Europe, but for relic islands, was gone and the insects had to take refuge in eastern Asia and then push south. With the Pliocene and the upheaval of the Alps the return migration westwards began, and you have the Arctic group, the Alpine in the newly-risen Alps, the oriental pushing along what is now the Ægean and the north of Africa and forming in southern Europe the new lusitanian groups with African elements. Then as Central and Western Europe emerged there came the Serbian migration, and last of all the Germanic, across what is now the submerged forest land, bringing the Swallowtail, the Large Copper, and the fenland *Leucanidæ*. Our S.E. group includes representatives of all these, unless, perhaps, the Germanic. Clement Reid has closely investigated the flora of the submerged forests, and he finds it very poor, nor does it include even in Devon and on the Bristol Channel any



remains of the lusitanian and southern plants. In fact, it is mostly arctic or sub-arctic. He holds that all these other groups were exterminated by the ice and must have come in casually, borne by winds and tides, floating logs, and such means. They are but casual. Yet if this is so, why are the lepidoptera of Galway and Kerry more numerous in species than those of Antrim and Down or Wicklow, which are all so much nearer Great Britain? How is it that there are so many rare species in the west as compared with the east? You would expect just the reverse, but you do not find the species growing fewer the farther west you travel, but instead more frequent. The Kerry coast is washed by the Gulf stream, and on a sandy shore you find the surf washing up such objects as cocoanuts and large mahogany-coloured beans the size of your fist, carried by the current from the Gulf of Mexico. But these do not germinate and you do not find any W. Indian insects on the wing in Kerry; instead it is lusitanian insects and those of the arctic and the alpine groups, the one coming from the south, the others from the north.

But while as a general rule butterflies and moths do not migrate, there are many exceptions. It might be said that usually these insects are very local. For example, the Mountain Ringlet has been known to occur on Croagh Patrick and the Connemara Mountains for the last 70 years, although it is very scarce and seldom to be seen. There it has remained. Again, other rare Irish insects are just as much attached to one locality as are the plants. *N. bicolor* is peculiar to the Killarney district and has remained so for three-quarters of a century. It has not been observed to spread or to increase. Often one field or one corner of a moor remains the habitat of an insect for generations, and you may go there at the proper season assured to find it, but elsewhere you need not venture. Though the shores of Lough Neagh round Lurgan offer every facility for *Taenio-campa opima* the Northern Drab, yet it has confined itself to the willow bushes along the bank of but one drain. But on the other hand there are quite a number of migratory insects that cross over to Ireland, some every season, others only after the lapse of years. Every now and then there comes round for example a Humming-bird Hawk year, and then *Macroglossa stellatarum* is in abundance and may be seen hovering in the sunshine over the flowers. There was

such a year about 1902, and again in 1928. It was in profusion along the face of the cliff between Killard Point and Ballyhornan. But last year none was to be seen. Along the coast of S. Brittany I have seen them in myriads flying over a field covered with seaweed. In certain seasons throughout such centres of distribution they multiply in vast numbers, escaping somehow or other the ichneumons that usually keep their numbers down to the normal. Therefore they are compelled to migrate in search of food. Powerful flyers as they are, they cross first to England and then on to Ireland, perhaps looking for a climate like that of their birthplace. But they die off. A few of the new brood may survive to the next season, but circumstances are against them, and the insect disappears till another migration takes place from the Continent. Most people are familiar with the Red Admiral and the Painted Lady butterflies, *Vanessa pyrameis* and *Cynthia cardui*. They are to be seen often in great numbers in early summer and early autumn. The first lives on nettles, the other on thistles. But it is very probable that in the north of Ireland both are migrants and not natives. It is a curious feature that in June if you want to find them the best place to succeed is on a mountain top near the sea. I have seen Red Admirals in great numbers during late June on the top of Divis, while none was visible in the lower country; though it is there, not on Divis, that they would find the nettles to lay their eggs upon, and if they were natives then it is close to a nettle patch, their cradle and their nursery, you would expect to find them. The theory is that they crossed over from England in a high layer of the atmosphere and the mountain top was the first land they met. But in the south of Ireland you will find the Red Admiral normally round the patches of nettles, and not as here sporting round flowers where it finds the honey most plentiful. At Killard Point there is a hedge one field back from the cliff and one autumn as I was working it for moths to my astonishment I put up quantities of Red Admirals. The only explanation I could devise was that they were resting there after their long voyage across the Irish Sea. Another migrant is the Peacock butterfly, but it comes up from the south of Ireland, where it is very abundant and where often you will see a clump of nettles black with its spiny caterpillars. But it has failed to establish itself in the north of Ireland. Under certain cir-

cumstances and in certain seasons it does visit us, but then it disappears. Last year was a Peacock year, and in certain parts round Belfast even non-lepidopterists were astonished at its numbers and its beauty as it visited their gardens. But then there are other butterflies, the majority, that seem never to migrate and remain true to their well-known localities, the White Admiral, for example, which does not seem ever to visit Ireland. These migrants, then, are a peculiar and exceptional class. Two further well-known examples are the Death's Head Hawk Moth, *Acherontia atropos*, and the Convolvulus, *Sphinx convolvuli*. Nearly every year odd specimens turn up and are duly recorded in the papers, but Ireland is too far from their centre and they fail to establish themselves here permanently, in spite of the abundance of their food plants, the potato and the bindweed. Such migrants you may find anywhere in Ireland, they have acquired the habit of roaming, and no doubt the unusual climatic conditions make them restless. In spite of the fact that one time pinewoods were the characteristic forest of Ireland, now there remain no native pine or fir. With the pine the pine moths must have disappeared. Yet with the replanting of pines of various kinds many of them have returned. One of these pine moths is the Bordered White, *Bupalus piniaria*. It is now abundant in pine woods, for example on Donard, at Churchill, Co. Armagh, on Bray Head, at Glendalough and Rathdrum, Co. Wicklow, at Caragh, Co. Kerry. But about 1888 I paid a visit to the late Dean Bristow and found him in great delight at discovering in Donard demesne a moth new to Ireland and it was this Bordered White. So it appeared first in Ireland in the 80's of the last century, and now it is, you may say, everywhere. But in ordinary circumstances it is just as hard for a new moth to establish itself in a land foreign to its species as it would be for us to make a living in a country where population has attained its maximum. But the pine moth, coming over doubtless in the egg or larval stage on young imported trees, found an unoccupied niche. There were no pine moths in Ireland, so the newly-planted pine trees were all their own. There is a Scotch form of the Bordered White, quite distinct from the English; the English has yellow markings on black, the Scotch white markings. As I have a long Scotch series captured in Perthshire and Argyll, I have compared them with the Irish and I find that they are almost

exactly alike. So the Irish pines were mostly imported from Scotch nurseries and brought the Scotch moth with them. There are several other moths that have come in this same way. Even in Belfast in many kitchens, greenhouses, and nursery gardens, various species of foreign ants have established themselves. Mr. Stelfox in his list gives no less than eight such introduced species that have come in either with imported plants or goods. So, too, the various species of cockroach, *Blatta*, are not native and only live in houses especially round the kitchen flue. During the coal shortage in Strangford there was a great consumption of what were locally called "Kaiser heels," in other words German briquettes, with the result that there came an invasion of German cockroaches, though whether they were *Blatta germanica* I cannot say. Another insect that appears to have come in quite recently is the Giant Sawfly *Sirex gigas*. It has got quite abundant round Strangford for example. It would seem to have been imported with foreign timber, for the larva is a borer and lives inside growing timber, especially pine. So again, the replanting of pine has brought back this exterminated pine insect, which has found a vacant niche wherein to establish itself. An intelligent farmer brought me a specimen and I explained to him its habits and how it was not a hornet but quite harmless to human beings. The next time I met him he told me he had seen others flying about some imported timber which had been stacked beside his house. But the Pine Hawk Spinx has not come so far, in fact it would be difficult for it to come unless by gradual migration across newly opened country as the larva in this case lives on the pine needles and would be shaken off and the pupa is of considerable size and buries itself at the roots of the pine. The appearance of such insects from time to time and their establishing themselves in this country is then easily to be explained; it is due to human agency.

But it is different with regard to the sporadic distribution in Ireland of insects belonging to northern and southern groups. Here we are at once up against the keenest controversy, the zoologist and the botanist are at daggers drawn against the geologist. Men like Clement Reid seem to hold that absolutely all insects were wiped out by the Glacial period. When it ended, however, they came gradually migrating from the Continent over vanished land bridges

and England and Ireland were re-occupied. For the sporadic occurrence in Ireland of insects absent from England, casual migration is his only explanation. Wind and wave and bird were the agents, and in the chapter of probabilities it happened that some few reached Ireland but missed Great Britain. Then there is another factor; the Würm glaciation did not extend over southern England, and in Ireland, too, Waterford, Cork, and Kerry escaped. Then some hardy insects may have been preserved and with the coming of milder climate they moved up north and east. But even if any did survive, we are told they were few and most exceptional. As far as I can understand the geologist practically ties us down to the post-glacial period for the repopulation of Ireland with lepidoptera. Sir Arthur Keith has investigated the submerged forest type of skulls and finds them all Neolithic, Iberian. So with the coming of the Neolithic man there came also a great invasion of lepidoptera to Ireland over some land bridge, and perhaps this invasion accounts for the S.E. group of insects. They came with the Neolithic race.

Then Professor Charlesworth points to the Aurignacian period as a time when from the east the fauna and flora were re-established in Ireland. Here, then, we have a series of waves, and we can understand how the second wave pushed the first off into the west, and the occurrence of so distinct a lepidopterous fauna in the west is explained. But is there time for all this since the Aurignacian period, and how can we explain the Galway fauna and flora as compared with that of Kerry? Why are the Galway lepidoptera so much more numerous than those of Kerry? Is there time, for example, for the long march of *Geomalacus maculosus* up from the lusitanian peninsula into Kerry since the Aurignacian period, and if *Geomalacus* why not Aurignacian man himself? But to leave the southern group, I should like to finish up on the northern group of lepidoptera as being one that interests us most in these parts. To take a few examples, there is *Gnophos myrtillata*, the Annulet, from Donegal and Kerry, the Yellow-ringed Carpet, *Entephria flavicinctata*, from Murlough Bay, Co. Antrim, *Dianthecia capsophila*, the Pod-lover, all round the Irish coast; *Agrotis hyperborea* from Co. Galway; *Nyssia zonaria*, Ballycastle and Co. Mayo; *Epiphron*, the Mountain Ringlet, the Mayo Mountains; and *Zygaena purpuralis*, Galway and Clare. One

noticeable fact about these insects is that they all, except for the Mountain Ringlet, are in Ireland exclusively sea coast insects, while in Scotland and on the Continent they are mostly mountain. *Hyperborea*, the Northern Dart, is found in Perthshire, but there only on the tops of the highest mountains, while in Galway it has been found among the cranberry growing in a bog. *Zonaria*, the Belted Beauty, on the Continent, is not attached to the coast at all, nor even to the mountains. *Capsophila* is confined in the British Isles to the Irish coast and to that of its colony the Isle of Man. Why this change of habitat in this country? Let me briefly reproduce Professor Harrison of Armstrong College in his account of the adventures of *Nyssia zonaria* as a representative of this northern class of insect. He goes back to some spot about Spitzbergen, when the circumpolar continent still existed, as its centre of origin. Thence it spread out laterally S.W. and S.E., finally reaching what is now western Scotland and western Ireland, then part of the one Continent. It worked down to the next place due S. through Central Europe, finally reaching the alpine regions when it spread; then working down S.-Easterly it attained Asia Minor. It may have been the coming of the ice ages that drove it thus forth. The ice age at any rate succeeded in cutting off the western colony in the British Isles from the other two colonies, that in the Alps and north Mediterranean coast and that in Asia Minor. Professor Harrison holds that there must have been a western extension of Ireland and Scotland, then united, to account for the steppes condition that prevailed in England, a condition postulating a long tract of country between such steppes and the ocean. The ice age then pushed *zonaria* out westward along the far-off Atlantic coastline of Ireland and Scotland. It could only live on the coast since the rest of the country was many feet deep in ice. Here, then, it and the other moths of the same class remained for millenniums till the sea shore habit became to them hereditary. But it was different with their brethren that had been pushed down into Switzerland and Asia Minor. They still remained as before, continental in their habits. At last the ice retired and they began to move back again northwards, those from the Alps and Italy creeping back as far as Sweden, those from Asia Minor gaining southern Russia. But the British colony was out along the coastline that bounded what is

now Ireland and Scotland. Gradually their coast yielded before the onrush of the Atlantic, and they retreated eastward upon their retreating beaches. When the land bridge between Ireland and Scotland fell in, the colony was split in two, the Irish and the Scotch, still the sea poured in, till at last England and Ireland were parted, and so we have now the last relics of these sea bred insects, the Irish refugees off Mayo and on the Co. Antrim coast, the Scotch on the Hebrides, and a new colony that followed the new Scotch coast southward till they came to a stand on the Lancashire and Cheshire beaches. There they still survive, witnesses to innumerable geological changes, survivors of an older world and an older order of things. So, too, we can explain their changed habit, still cleaving fast to the temperate climate of the coastlands, while their continental brethren have remained true to the original habits of the race.

In the same way we can understand why it is that so many Irish insects, such as the Transparent Burnet, *purpuralis*, the Scotch Annulet, *myrtillata*, many of which in other countries are purely alpine, have become in Ireland sea coast insects. The ice drove them down to those long-submerged western shores, where the conditions resembled those of the mountain tops. *Epiphron*, the Mountain Ringlet butterfly, is almost the only creature that remains true to its mountain associations, away in Connemara, far apart from its brethren in the Lake District and the Scottish Highlands, climbing when the ice had gone to its ancient ancestral peaks once more.

Botanists speak about plant associations in the different natural environments. There are also in like manner insect associations which again vary with the environment, be it mountain, wood, sandhill, or open country. But we may speak generally of an Irish insect association, and its general features are much the same north or south, though we have these three intruding elements which cause a distinction between east and west.

A moth may gradually disappear as you move from the north to the south or *vice versa*, and the insect association of some ancient Irish forest will be much richer than that of a highly cultivated district, or where the woods have long been cleared away.

For all that the insect association of, say, Valentia Island is much the same as that of Strangford, Co. Down.

But it is different if you cross the water. The insect association of a Highland glen or of a Scotch mountain varies much from that of the Antrim glens. The Argyll mountains are in full view of the Antrim coast and are not far distant, yet the insect association of the one differs much from that of the other. Numerous insects abundant here are absent in Argyll, while many of those abundant in Argyll are sporadic here, perhaps not to be found at all unless you go off to Co. Kerry. It is the same if you compare a Wicklow or Kerry association with that occurring round Falmouth in Cornwall, or on the heaths inland from Southampton. Each association varies as to its most abundant elements. Even the insects abundant both in Argyll and Antrim vary so much that at first you put them down as different species, melanism is so rife among the Scotch moths. A Scotch insect will often be almost black, while the Irish is usually of the typical lighter colour. Then round Southampton the Skipper butterflies are everywhere, while in Ireland they scarcely occur except in Clare and Galway.

To conclude, I have brought before you to-night what is to me at any rate a most fascinating study, and yet a most bewildering one to explain. I fear I have not attempted any explanation but have merely hurled at your heads an undigested mass of facts and observations. But it is a subject that cannot be isolated, the lepidoptera and insects generally must be taken along with the flora; botany and geology may help in the long run to solve this problem.



*10th December, 1929.*

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Mr. E. J. Elliott, Ex-President, in the chair.

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REV. S. P. WHITEHOUSE.

“ LIFE: WHAT IS IT? ”

[No abstract.]

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*14th January, 1930.*

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Mr. E. J. Elliott in the chair.

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MR. CHARLES E. KERR, B.A.

“ THE STARRY HEAVENS.”

[No abstract.]

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*28th January, 1930.*

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The Very Rev. W. P. Carmody, President, in the chair.

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MR. ARTHUR E. MUSKETT, M.Sc., A.R.C.Sc. (Lond.)

“ THE VIRUS DISEASES OF PLANTS.”

[No abstract.]

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*25th February, 1930.*

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The Very Rev. W. P. Carmody in the chair.

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MR. D. J. CARPENTER, A.R.C.Sc. (Lond.)

“ THE WAYS OF BUTTERFLIES AND MOTHS.”

[No abstract.]

## 109th ANNUAL MEETING

The Annual Meeting of Shareholders and Members for the 109th Session was held in the Old Museum Building, 7 College Square North, on Tuesday, 28th October, 1930, to receive the Council's report with the Hon. Treasurer's statement of accounts, to elect five members to the Council of Management, and to transact other business as may be brought forward pertaining to an annual meeting.

Mr. E. J. Elliott, Past President, in the unavoidable absence of the President (the Very Rev. W. P. Carmody, M.A., M.R.I.A.), occupied the chair, and among those present were Colonel Berry, M.R.I.A.; Messrs. W. Arthur Fry, J. W. Gillmour; F. Adens Heron, D.L.; Wilson Irwin; H. C. Lawlor, M.A., M.R.I.A.; R. S. Lepper, M.A.; D. E. Lowry, J.P.; Professor W. B. Morton, M.A., M.R.I.A.; Dr. A. Trimble, J.P.; Messrs. A. G. Pomeroy, M.A.; Joseph Skillen; Professor Gregg Wilson, D.Sc., M.R.I.A.; the Hon. Treasurer, and Hon. Secretary.

Apologies were received from the President; Miss A. Elliott, B.A.; Major Blakiston-Houston, D.L., M.P.; and Mr. T. Edens Osborne, F.R.S.A.I.

The Chairman referred to the illness of Mr. Osborne, and it was decided that a letter be sent to him conveying the sincere regret of the shareholders and members, and to express the hope that he would soon be restored to health and vigour.

The Chairman announced that the meeting had been advertised and called upon the Hon. Secretary to read the notice convening the meeting.

The report of the Council reads as follows:—

### ANNUAL REPORT, SESSION 1929-30.

Your Council, in presenting its Annual Report for the 109th Session, desires to state that the number of shareholders and members at the end of the present year total 276, as compared with 288 in the previous year, a decrease of 12 due to various causes. Even with such a membership your Council is of the opinion that it should be possible to

have large gatherings at each lecture or other function of the Society. It is incumbent on all members to attend the meetings regularly, to take a greater interest in the work of the Society, and to help by their influence the introduction of suitable new members.

It is the intention of the Council to make the rooms of the Society a meeting place for persons interested in scientific, literary and professional subjects. The Council has under consideration the advisability of increasing the interests of the Society by opening the premises at least one day in the month so that members may meet formally for discussion on subjects of interest.

Attempts have been made to organise excursions during the spring and summer, but latterly these have not been attended with the success which they deserve. This is, however, a branch of the Society's work which your Council will consider taking up with more energy during the coming season.

Last year an innovation was made by the Archæological Section to have afternoon meetings at which tea was provided, and these proved very successful, allowing members living out of Belfast a better opportunity of being present than if the meetings had been held in the evening.

The Council lost during the year one of its members, Mr. Wm. Riddell, who resigned to take up a lectureship in Zoology in Cairo University. It was unanimously decided to co-opt Dr. R. W. Livingstone, Vice-Chancellor of Queen's University, on the Council in place of Mr. Riddell.

Mr. E. J. Elliott, a past President, was nominated by your Council to represent the Society on the Libraries, Museums, and Art Committee of the Belfast Corporation, and this Committee has co-opted Mr. Elliott as your representative.

A telephone has been installed in the building on the ground floor, and is much appreciated by the tenants.

The top floor of the building is still without tenants, and your Council would like to see this part of the building occupied, so that the entire building would be the home of Professional Societies. It is hoped that this will soon occur. This top floor is well lighted and very desirable.

## LECTURES.

Eight lectures were given during the year on subjects of varied interest. The President (the Very Rev. W. P. Carmody) took as his address "The Ancient Monuments Act of Northern Ireland, 1926, and its working." Other subjects dealt with Biology, Astronomy, Archæology, and Natural History. In addition to these five lectures of practical importance appertaining to Archæology were given under the auspices of the Archæological Section.

The programme for the coming session has been carefully selected and provides for lectures on Irish History, Nature Study, Astronomy, Local History, and Archæology; and Industrial Art. It is hoped and believed that these lectures will prove attractive and that the audiences will be large and representative. The Archæological Committee is also arranging a series of lectures of Archæological interest.

The large Lecture Room, now renovated and improved, is an admirable hall for meetings and lectures. The entire building has been also improved at considerable cost and is now thoroughly suitable for the purposes for which it is intended.

## EXCHANGES.

A number of publications of kindred Societies have been received in exchange for the Society's Proceedings. A list of these exchanges will be appended to the Report.

## COUNCIL'S THANKS.

To all those who have assisted the Society during the past year the Council wishes to tender its sincere thanks, as well as to the Press for the full reports of the meetings.

## FINANCIAL STATEMENT.

Mr. W. B. Burrowes, the Hon. Treasurer, will place before you the Financial Statement.

## ARCHÆOLOGICAL SECTION.

The Archæological Committee continues its activity. During the summer it undertook the effort to raise £500 for the repair and preservation of Bonamarghy Priory at Ballycastle, and it is pleasant to record that in this effort the Committee is having the hearty co-operation and assist-

ance of the Belfast, the Route, the Londonderry, and the Limavady Field Clubs, the Down and Connor Historical Society, as well as the Royal Society of Antiquaries of Ireland and the Society of Antiquaries of London. Already the money is coming in satisfactorily. A full account of the year's work of the Section will be submitted to the members at its Annual Meeting next month.

#### ELECTION OF COUNCIL.

In accordance with the constitution of the Society five members of the Council retire, namely:—Dr. Livingstone, Professor Morton, Messrs. F. Adens Heron, R. S. Lepper, and D. E. Lowry. All these members are eligible for re-election and the Council recommend to the meeting that they be returned for another three years.

#### FINANCIAL STATEMENT.

Mr. W. B. Burrowes, Hon. Treasurer, submitting the Financial Report, stated that they closed the year with a balance against them of £40 18s 7d, and probably in another eighteen months they would be clear of debt. The Society's security was very good. A statement of receipts and expenditure as passed by the Government Auditors appears on page 50.

#### ADOPTION OF REPORTS.

The Chairman, in moving that the Reports now submitted be adopted, mentioned that the Society was entering upon its 110th Session. They felt pardonable pride in the thought that the roots of the Society went back so far into the history of Belfast. When they thought of the men who erected that building they must form a very high opinion of Belfast of that day. The year had been uneventful, but the future of the Society looked bright, and progress had been considerable. He specially mentioned the interest manifested by their President, the Dean of Down, who was also Chairman of the Archæological Committee, Mr. Arthur Deane's activities on behalf of the Society, Mr. Bel Burrowes' management of the finances, and Mr. Lawlor's work in the Archæological Section.

Mr. W. Arthur Fry, in seconding the adoption of the reports, expressed gratification that the Chairman at to-day's

meeting had been co-opted a member of the Libraries, Museums, and Art Committee of the Belfast Corporation, in recognition of the fact that the Society had been the backbone of the new Museum.

#### ELECTION TO COUNCIL.

It was proposed by Mr. J. W. Gillmour, seconded by Mr. Alexander Milligan, and passed unanimously, that Dr. R. W. Livingstone (Vice-Chancellor of Queen's University), Professor Morton, Messrs. F. Adens Heron, R. S. Lepper, and D. E. Lowry be re-elected for another three years.

#### SUGGESTIONS.

The Chairman announced that he would be very glad to hear any observations that members might like to make of interest to the Society.

Mr. H. C. Lawlor, M.A., discussed the advisability of the Society extending more encouragement to young people, such as Queen's University students, to bring forward original research in Science and Archæology.

Colonel Berry, M.R.I.A., outlined a scheme for adapting the various ancient buildings throughout Ulster as "period" museums, mentioning Carrickfergus Castle as being specially suitable for this purpose, its history dating back to the beginning of the Norman period.

Mr. D. E. Lowry, J.P., referred to the unique collection of prehistoric antiquities in the National Museum, Dublin, which was dredged from the bottom of the River Bann in the past. The Society, in his opinion, should advocate to the Government of Northern Ireland that a watch be kept during the present dredging operations, as the material was being deposited in Lough Beg without examination. When the river bed was deepened during the last century the dredgings he mentioned were spread on the banks of the river and the recovered gold ornaments, bronze and stone weapons and implements and other articles were the result. At that time only one-eighth of the river had been dredged. Now the other seven-eighths were to be dealt with, and if such valuable finds were recorded from the smaller area, what might be expected from the larger area under the dredger.

The suggestions were well received, and the Chairman promised they should have the careful consideration of the Council and Archæological Committee.

## ARCHÆOLOGICAL SECTION.

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Annual Report of Committee.

The Fourteenth Annual Meeting of the Section was held in the Old Museum Building on Wednesday, December 3, the Very Rev. the Dean of Down in the chair. There were present:—Colonel Berry; Messrs. D. E. Lowry (President), E. J. Elliott, R. S. Lepper, Alex. H. Davidson, Joseph Skillen, A. A. Campbell, F. M. Greeves, J. Theodore Greeves, Arthur Greeves, Mr. and Mrs. Hodgson, Mrs. Fallon, Miss Elliott, and the Hon. Secretary. The Hon. Secretary read apologies for absence from Messrs. Arthur Deane, W. B. Burrowes, R. A. Mitchell, and Major C. Blakiston-Houston, D.L., and read the Committee's Annual Report as follows:—

“ The Archæological Section continues its activity. During the past year it has lost three members by death, six by resignation, and two by removal. Eight new members have joined, the membership being now 122.

“ During the winter papers on various archæological subjects were read, two by Mr. Ian Richmond on (1), ‘ The Irish Chieftain's House and the Roman World ’ and (2) ‘ New Discoveries on Hadrian's Wall in 1929 ’; by the Rev. Leo M'Keown, C.C., on ‘ The Franciscan Order and its Settlements in Antrim and Down ’; by the Hon. Secretary on ‘ Some Tentative Deductions arising from the Study of Three Ancient Monuments ’; and by Mrs. Anderson and Miss Gaffikin, entitled ‘ Some Prehistoric Sites in the Dordogne and Pyrenean Regions.’

“ An experiment was made on two occasions by having these papers read at afternoon meetings, preceded by tea; these meetings were well attended and suited the convenience of county members—on the other hand, some members engaged in business were unable to attend. For the coming winter session, papers are promised by Professor Curtis, M.A., of Dublin University, on ‘ Some Further New Evidences regarding De Courci's Occupation of Ulster, and his followers ’; by Mr. D. B. Quinn on ‘ The Discovery of an Iron Age Settlement at Malone ’, with an exhibition of some of the finds made; by Mr. S. Turner on ‘ Two Ancient Churches on Inniskeel Island with certain Pagan

Survivals'; by M. E. Rea, B.A., on 'Some Early Irish Skeletal Remains'; and by the Hon. Secretary on 'The Genesis of the Diocese of Connor, including Down and Dromore.'

"During the summer the Committee undertook the effort to raise £500 for the repair and preservation of Bonamarghy Priory at Ballycastle, and it is pleasant to record that in this effort the Committee is having the hearty co-operation and assistance of the Belfast, the Route, the Londonderry, and the Limavady Field Clubs, the Down and Connor Historical Society, as well as the Royal Society of Antiquaries of Ireland and the Society of Antiquaries of London. Already the money is coming in satisfactorily.

"The repairs to Clough Castle will be carried out under Mr. Ripplingham's supervision.

"The balance to credit of the Archæological Section's account on 31st October is £187 3s 1d, of which £51 belonged to Bonamarghy and £2 to Clough Castle Fund."

The report was adopted.

A resolution expressing sorrow on the recent death of Mr. T. Edens Osborne was passed by the meeting, all standing.

The Very Rev. the Dean of Down and Mr. H. C. Lawlor were unanimously re-elected Chairman and Hon. Secretary respectively for the coming session.

The following members were duly elected to the six vacancies on the Archæological Committee:—Colonel Berry, Professor Walmsley; Messrs Campbell, Skillen, Lepper, and Elliott; these, with the ex-officio members, the Dean of Down (chairman), Messrs. D. E. Lowry (president), A. Deane (hon. sec.), W. B. Burrowes (hon. treas.), Oliver Davies, and H. C. Lawlor (hon. sec. Archæological Section), form the twelve members constituting the Committee under the rules.

Some discussion took place as to the desirability of preserving the remains of Clough Castle, Co. Down, and Quoile Castle, Downpatrick, but it was decided that until Bonamarghy Priory was finished it would be unwise to undertake further efforts in this direction, but these castles were desired to be put down on a waiting list for future consideration.



PAPERS READ BEFORE THE ARCHÆOLOGICAL  
SECTION DURING THE SESSION 1929-30.

*Thursday, 3rd December, 1929.*

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By MR. IAN A. RICHMOND, M.A.

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“ THE IRISH CHIEFTAIN’S HOUSE IN ROMAN  
TIMES.”

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The paper gathered together the literary references concerned with the constructional details of the Irish Chieftain’s House, demonstrating that there was, apart from the round structure, the aisled rectangular type of building not unlike the great banqueting hall at Tara. This was brought into connection with La Tène prototypes on the Continent, and with another branch in the same descent, viz. : the Romano-British so-called Basilican house. (Illustrated.)

*On the Same Evening.*

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By MR. H. C. LAWLOR, M.A., M.R.I.A.

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“ SOME TENTATIVE DEDUCTIONS ARISING FROM  
THE STUDY OF THREE ANCIENT MONUMENTS.”

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The monuments discussed were the Hole-Stone at Dough, the so-called Cloch-Or at Clogher, and the small carved stone some 25 yards south of the tower of Clogher Cathedral. (Illustrated.) This paper, having been awarded a special prize for original work by the Belfast Naturalists’ Field Club, has since appeared in full in the *Irish Naturalists’ Journal* for September, 1930, March and May, 1931.

*Thursday Afternoon, 6th February, 1930.*

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By the REV. LEO. M'KEOWN, C.C.

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“ THE FRANCISCAN FOUNDATIONS IN THE  
COUNTIES DOWN AND ANTRIM.”

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This paper has been published in the *Journal* of the Down and Connor Historical Society for 1931.

[The Committee desires to record its thanks to Mr. D. E. and Miss Lowry, who entertained the members to afternoon tea.]

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*Thursday, 27th February, 1930.*

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By MR. IAN A. RICHMOND, M.A.

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“ SOME DISCOVERIES MADE ON HADRIAN'S WALL  
DURING 1929.”

(Illustrated.)

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This paper has been published in *Transactions* of the Cumberland and Westmoreland Antiquarian and Archæological Society, vol. 30 (1930).

*Thursday Afternoon, 13th March, 1930.*

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By MRS. ANDERSON and MISS M. GAFFIKIN.

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“ SOME PREHISTORIC SITES IN THE DORDOGNE  
AND PYRENEAN REGIONS.”

(Illustrated.)

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The village of Les Eyzies lies south-east of Périgieux in the south-west of France. It is on the Vézère, a river which winds through a valley between steep limestone cliffs, which have sheltered the inhabitants from earliest times to the present day. The older houses of the existing village are built into the base of the cliffs, and the celebrated shelter of Cro-Magnon is still in use as a stable. Most of the surrounding prehistoric sites belong to the State and are in charge of the well-known archæologist M. Peyronney, who acted as our guide and instructor during our stay at Les Eyzies. The rock shelters and caves occur at different levels on the cliffs, the shelters were often large, and many have an overhanging roof; the caves are not used as places of habitation, but for the display of painting and sculpture.

The earliest site is that of La Micoque, which lies open to the sky on the sloping bank of the Vézère. Here the lowest layer of industry is Proto-Chellean; this is succeeded by a Chellean layer; then come evidences of a flood and a cold sterile layer, possibly representing the Mindel glaciation; these are succeeded by another flood; and then come two layers of Acheulean occupation separated from one another by a third flood. The upper Acheulean industry is typical Micoque, whilst the top layer is early Mousterian. Authorities differ as to the exact inter-glacial period occupied by Chellean man; Sollas, Obermaier, and others place him in the Mindel-Riss, but the Abbé Breuil has lately advanced the view that Mousterian industry began in Western Europe at the close of the Mindel-Riss phase and if this view proves correct the Acheulean and Chellean industries will require to be moved back.

The type station of Chelles on the Seine has yielded a full Chellean industry in conjunction with the remains of

the ancient elephant and the Etruscan rhinoceros. In the Mauer sands these animals were also found with the famous Mauer or Heidelberg human jaw, and the Piltdown remains probably belong to this period. The principal Chellean implement is the large hand axe or *coup de poing*. In the earlier specimens much of the crust of the flint is left on the butt, but later this disappears, the edges are wavy and the flaking is heavy. Scrapers and borers are also found. The Acheulean industry is a continuation of the Chellean, and in this period wood was used for chipping flints. The *coups de poing* are cordiform, thinner, more finely worked, and with straight edges; some are now quite small, probably for setting in wooden handles. Chellean and Acheulean implements are essentially shaped cores; a few flaked implements, however, also occur, and they become more numerous with the appearance of the Levallois flake towards the close of the Acheulean period. The Acheuleans still lived in the open, but the climate was growing colder and wetter; the ancient elephant had migrated southward and had been replaced by the Mammoth. The Acheuleans probably clothed themselves in skins, as scrapers suitable for skinning animals now appear. No human remains of this period have been found. The early Mousterian layer contains no trace of reindeer, showing that as yet the climate was not very cold.

We next visited the station of Le Moustier, which gives its name to the Mousterian industry. It lies on the bank of the Vézère, a few kilometres from Les Eyzies and consists of a large shelter about 90 feet up on the hill side, and a lower terrace. The shelter was excavated by Lartet and Christy in 1863 and the finds divided between the British Museum and the Musée St. Germain. The lower terrace was excavated first by Hauser, who in 1908 found a skeleton of a youth of 16 years of the Neanderthal type; this he sold to the Berlin Museum for 125,000 francs. The following is a section of the lower terrace, the excavation of which was resumed by Peyronney and others in 1912:—

9. Sterile.
8. Ancient Mousterian, climate wet.
7. Mousterian, with heart-shaped *coups de poing*.
6. Mousterian of the Abri Audit type, knives and triangular points.

5. Land despoiled by flood.
4. Typical Mousterian points with long retouches.
3. Lower Aurignacian, Cro-Magnon.
2. Middle Aurignacian.
1. Vegetable soil.

The layer of sand (5) caused by flooding is due to the retreat of the Würmian ice, which was followed by immense floods.

Mousterian culture is thought to have begun during the Riss-Würm inter-glacial period and lasted throughout the Würm glaciation. The earliest finds in the Dordogne indicate a warm climate, becoming colder and wetter and finally intensely cold with dry tundra conditions. The contemporary fauna of Le Moustier comprises the mammoth, woolly rhinoceros, giant deer, cave bear, bison, and reindeer. The inhabitants of Le Moustier were of the race known as Neanderthal, so named from the celebrated skull found at Neanderthal, near Dusseldorf, in 1856. Since then many human remains of the same type have been found and prove that this race was widely distributed throughout Europe, a Neanderthal man hunted and killed large animals which he cooked and ate. He sheltered in caves from the severe climate, and, no doubt, clothed himself in the skins of animals. Quantities of broken bones from which he extracted marrow are found in the Mousterian sites. Certain finds indicate that he had burial customs. The bodies of three children found at La Ferassie were buried in small trenches with the legs bent, and here the first known human sculpture was found—a cupped stone covering a Mousterian grave. The most characteristic Mousterian implement is the triangular point, a flake retouched on one face only, the earlier specimens are large with long retouches, later they become smaller and more knife-like. They were hafted into wooden shafts and used as spear heads. Another characteristic tool is the scraper in a variety of shapes for skinning and scraping game. Discs, knives, hammer stones, borers, and some bone tools are also found; the last were probably used for working flints.

The Proto-Chellean, Chellean, and Acheulean industries comprise the Lower Palæolithic period, and the Mousterian corresponds to the Middle Palæolithic. The Upper Palæolithic period includes the Aurignacian, Solutrean, and Magdalenian industries.

The next station in the cultural sequence is Laugerie Haute. The roof of this shelter must have fallen, as the rocks are now lying on the roadside, the original shelter is in behind them. The section is as follows:—

6. Sterile.
5. Middle Aurignacian.
4. Upper Aurignacian.
3. Early Solutrean.
2. Typical Laurel-Leaf Solutrean.
1. Magdalenian.

The sequence at Laugerie Haute ends here, but it is continued at Laugerie Basse, a few hundred yards farther up the Vezère. M. Peyrony has concluded that the collapse of the roof, probably due to seismic disturbance, occurred during Magdalenian time and forced the inhabitants of Laugerie Haute to seek a new home in Laugerie Basse. Laugerie Basse was evidently occupied through the Transitional and into the Neolithic period, and fragments of Gallo-Roman pottery have been found.

Another well-known station, the Grotte des Eyzies, is the site of the beginning of all the research in the valley of the Vezère. It was excavated in 1863 by Lartet and Christy and yielded mainly a Magdalenian culture.

All through Upper Palæolithic times the climate was cold, though the mean temperature was slightly warmer in the Aurignacian period during the Achen minor oscillation. In Upper Aurignacian and Solutrean times cold steppe conditions supervened; Magdalenian times correspond with the Buhl readvance of the glaciers which caused moist tundra conditions. Then came another dry steppe period and after that the climate gradually became damper and improved, until in Azilian times it resembled that of the present day, though somewhat colder. The contemporary fauna of Upper Palæolithic times includes tundra fauna, such as the obi, lemming, mammoth, woolly rhinoceros, and reindeer; also browsing animals, horse, cattle, stag, and giant deer; the cave bear, cave lion, and cave hyena also existed during these times.

After the maximum of the Würm glaciation a new race of men entered Europe. These were the Cro-Magnons, who existed in Europe throughout the Upper Palæolithic period.

The name Cro-Magnon is taken from the rock shelter of that name at Les Eyzies. The earlier culture of this race is known as Aurignacian, after the rock shelter of St. Aurignac in the Haute Garonne. Opinions differ as to where these Aurignacians, or Cro-Magnons, came from; the accepted theory brings them from North Africa, for a similar and earlier culture, the Capsian, has been found in Tunisia. The Aurignacians probably migrated into Europe by the land bridge then existant at Gibraltar, and by the bridge at Sicily into Italy. Professor Osborne considers that they came from the East, and the latest excavations made by Dr. Absolon in Moravia seem to confirm this view. Though differing slightly from modern man, Cro-Magnon man can be classified as *Homo sapiens* and referred to as Neanthropic in contrast to his Palæanthropic predecessors. The term Cro-Magnon covers a diversity of types, but all with sufficient affinities to be grouped under one heading. Cro-Magnon man lived principally by hunting and probably constructed traps and pits to snare his prey. The skins of the animals killed were used as clothing, the meat cooked and eaten.

The Aurignacian industry shows a complete change from the heavier Mousterian. It is certain that Aurignacian and Mousterian men co-existed in France, but there is no real evidence that they intermingled. Probably the newcomers exterminated their repulsive-looking predecessors, for from this time onwards no further traces of Neanderthal man are found in Europe. The Audi point, an implement first found at the Abri Audi above Les Eyzies, is considered by some authorities to be transitional between the two cultures. If this is so, it is more likely to have been made by Mousterian man under Aurignacian influence. In the Aurignacian industry are found graters, keeled scrapers, side scrapers, end scrapers, numerous flint flakes, also a wonderful series of points. The Chatelperron point is said to be a development of the Audi point; it evolves into the Gravette point and finally into the tanged Font Robert point. The whole series shows a steady improvement in the technique of flaking. There are also bone implements, needles, lance points, and sceptres. Ornaments and necklaces of pierced shells and animals' teeth have been found; some of the shells found in the Dordogne came from the Mediterranean, proving that the Aurignacians were traders. Quartz, which

is not found in the neighbourhood, was also much prized. Cro-Magnon man probably had a well-organised tribal system, and quite evidently had a form of religion and believed in the efficacy of sympathetic magic. Their burial customs show that they believed in life after death, for in several cases personal belongings were buried with the body. They stained their dead with red ochre, the idea probably being that red, the colour of blood, meant life. In most cases the body was buried in a flexed position. The present inhabitants of the Dordogne have undoubted Cro-Magnon affinities and are probably their descendants. Ranke claims that the type is to be found to-day in the hills of Thuringia, and the Cro-Magnon type of head is said to be found among the Berbers.

There is now an interruption in the sequence of the industries attributed to Cro-Magnon man. When cold steppe conditions supervened at the end of Aurignacian times an alien race of hunters followed the steppe animals into Europe, probably from Western Asia, and brought a new industry with them. This industry, known as Solutréan from Solutré in the Saone valley, is different from the Aurignacian. The characteristic implements are worked all over and resemble very fine core implements, though they are probably made from flakes. The new technique attains a high finish by pressure flaking, the removal of small thin flakes by pressing near the edge with a bone tool instead of striking them off. The most characteristic Solutréan implement is the laurel-leaf blade. In upper Solutréan layers the Aurignacian shouldered point reappears. The Solutréans kept chiefly to the low ground, though they entered the mountain valleys of the Dordogne. Later with the changing climate and encroaching forest conditions they retreated eastward, though some may have remained and merged with the Cro-Magnons. There are different opinions concerning the Solutréans. Osborne says "This may be the race of Brünn, Brück, and Predmost, the remains of which are found associated with the highly perfected spear heads." Dr. Henri Martin and M. Peyrony both believe that the Solutréans were Mongols who existed in France in small peaceful colonies and that they were the ancestors of the modern Esquimaux. The famous Chancelade skull is said by some anthropologists to be Solutréan,



and by others to be Magdalenian, but nearly all maintain that it strongly resembles the Esquimaux. It has been stated that Solutréan man produced no art; but this has now been proved to be untrue, for Dr. Henri Martin has discovered undoubted Solutréan sculptures at Roc en Charente, one being the sculpture of a bird, a form rare in Palæolithic art.

The Magdalenian industry, also attributed to Cro-Magnon man, is so named after the rock shelter of La Madeleine on the bank of the Vezère. It is a continuation of the Aurignacian after the departure of the Solutréans. In certain mountainous districts into which the Solutréans did not penetrate, the Aurignacian industry develops without a break into the Magdalenian. There are fewer flint implements in Magdalenian culture, these show no pressure flaking, but there is an extensive bone and horn industry. Harpoons appear in a primitive form in middle Magdalenian times, later they develop a single row of barbs, and still later a double row. The sceptre or bâton de commandement is specially characteristic of this period; it has been claimed to be a shaft straightener and also a dress fastener. The Abbé Breuil demonstrated his latest view to us, that it may have been used as a guide in chipping flints, the edge of the flint being brought parallel with the hole while the chipping instrument was pushed up from underneath and the flake removed.

Many fragments of bone, horn, and ivory, forming ornaments, weapons, and tools, bear witness to the artistic skill of Cro-Magnon man; they are classed as art mobilier. With these objects are found stone implements of the different cultures and the bones of several animals, and there is therefore little difficulty in dating them. The Magdalenian art mobilier is much superior to that of the Aurignacians, human statuettes are, however, more frequently found in Aurignacian art. The sculptures in bas relief of Aurignacian and Magdalenian art were probably made with stone hand-picks. The Abri of Laussel when excavated yielded a series of cultures from Acheulean to Magdalenian. The most important finds were the sculptures of the Venus and the Hunter. The Venus measures 45 centimetres in height and is cut with a relief of 2 centimetres; the body, except the head, is polished and has been painted in parts. The Hunter measures 40 centimetres; he is supposed

to be throwing a spear. There is a fine engraving of a fish on the roof of the Abri du Poisson, which is either Aurignacian or early Magdalenian, but it is difficult more definitely to date it as only untrimmed flint flakes have been found in the abri. During the excavation of Cap Blanc the wonderful carving of a horse was uncovered, which is cut in relief to a depth of 35 centimetres, the head, mane, and body being exceptionally well executed. There are other carvings in the cave of horses, bison, and antelope. The skeleton of a man was found buried under a Magdalenian layer; M. Peyrony believes he may have been the sculptor or perhaps a man of importance in his tribe. The engravings in the caves were probably made with burins or gravers. For the paintings the following materials were used:—iron ore, (from which red, orange, and yellow colours were obtained) carbonaceous matter and pyrolusite, a black ore of manganese (from which black was obtained) and kaolin, which gave white. The materials were ground, mixed with fat, and probably applied with a primitive brush. The lighting of these caves must have proved difficult, but probably lamps were used, for a sandstone lamp with an ibex carved on its base was found at La Mouthe. The fuel was probably marrow fat and the wick made of moss. The Esquimaux use similar lamps to-day, which give an efficient light and no smoke. It is possible to date the cave art. In some places the animals are engraved or painted one on top of the other, and a study of these palimpsests shows a general sequence of styles, which are also found in the art mobilier of the datable archæological layers. There were, therefore, definite developments of art corresponding to changes in the industries. In the earliest Aurignacian engravings the incisions are wide and deep, the animals are shown in profile, the horns are sometimes represented front face, and the paintings are monochrome line tracings. In Magdalenian times the engraving is at first still wide and deep, but the silhouette is more life-like; later the lines are less deep but more clear and continuous, and scratches meant to represent the hair are shown on the silhouette, while finally the engravings deteriorate, the lines are mere scratches and difficult to follow. In the paintings the line is usually red or black, hairy masses and articulations being represented on the silhouette. Later, colour is used in profusion, the silhouette being completely covered. In this way the modelling

was lost, but this is regained still later by the development of polychrome work in which the silhouette is drawn in completely in black and the body richly coloured in different tints. The artist sometimes used the natural curves on the cave walls as part of the outline of the animal. Paintings of tectiforms, generally believed to represent huts, are found in many of the caves.

The meaning of the cave art has been greatly discussed and the theories of "Art for art's sake" and sympathetic magic have both many adherents. M. Peyrony is a firm upholder of the latter theory. To anyone who has visited the caves it seems the more probable, as many of the most decorated parts are very difficult of access. According to M. Peyrony the cave of Font de Gaume was a temple, not a habitation, as any objects found in it appear to have been accidentally dropped; there is no profusion of implements in any of the art caves as in the rock shelters. The priest drew the image of the animal to be hunted and performed rites and recited incantations which were supposed to cast a spell on it. Sometimes the animals were depicted with spears sticking in their sides and blood flowing from the wounds. Similar magic is still practised by the aborigines of certain countries.

Font de Gaume opens on the side of a hill, and consists of a long, winding corridor. The paintings comprise nearly all the types of animals figured in cave art. In one narrow fissure high above one's head are engravings of a lion and horses and two paintings of rhinoceros. Farther on is a small offshoot known as the room of the bison, for in it the ceiling and walls are literally covered with paintings of bison. Farther on still is a human head apparently wearing a mask. It may have been considered unlucky to draw the human form, as it is seldom depicted, and the face is practically never shown. There are numerous palimpsests in Font de Gaume. The cave of Combarelles is a long low winding tunnel containing numerous engravings and some outline painting of bison, ibex, mammoth, bear, rhinoceros, and humans. The small cave of La Greze is only 8 yards long and 6 yards wide and here the principal object of interest is a splendid engraving of a bison in early Aurignacian style. In the cave of Comarque the most striking feature is a

magnificent bas relief of a horse's head, the rest of the body being indicated by natural reliefs in the wall. The Abri de la Mouthe is noted for a particularly fine tectiform.

From Les Eyzies we travelled south to the Pyrenees and made a short stay first at Foix and then at St. Girons. The cave of Portel, the first we visited in this district, has a narrow entrance, just large enough to admit a man. It is a long narrow cave, with several branches, at the ends of which are many of the best drawings; there are numerous bison, horses, some humans, an owl and a small red horse in the style of the Spanish paintings. Below the cave is a second grotto through which flows an underground river.

The cave of Niaux, the grandest in France, was discovered in 1906. Some idea of its size may be gathered from the fact that, after exploring it, it took us nearly half-an-hour's steady walking to regain the entrance. The cave is on the side of a mountain near Tarascon en Arrière. A long gallery runs beyond the borders of a subterranean lake and over a former underground river bed and enters a great chamber. There are numerous paintings of bison, horses—both of the Celtic and Asiatic steppe types—ibex, chamoix, and stags. The colours are not faded as in Font de Gaume, but fresh and bright as if painted yesterday.

The cave of Marsoulas is near Salies-du-Salat; it opens half-way up the hill side; it was probably much longer originally but the front part has fallen in. Nearly all the paintings are on the left. There is a palimpsest of a bison in polychrome over part of a horse which is in turn over a conventionalised hand. There are also bison, ibex, stag, and tectiforms, and a large barbed line which the Abbé Breuil believes to belong to Azilian art. Lower down the same valley is the cave of Tarté, which has no art, but a rich Aurignacian industry.

Unfortunately, we were unable to get into the cave of Gargas, famed for its impressions of human hands, often showing mutilations, in some cases one or more joints of the fingers having been removed. Certain modern primitive people remove finger joints to appease evil influences, and probably the mutilated hands of Gargas represent an early form of magic. We were also unable to enter the caves of Tuc D'Audoubert and Trois Frères, the

former famous for the "Bison of Clay," a most splendid piece of modelling, while in the latter cave is the wonderful painting known as "The Sorcerer."

The last site on our list is the Mas d'Azil, an immense natural tunnel piercing the hills, through which run both the river and the main road. The famous Azilian deposits are on the left bank of the river at the entrance to the tunnel. The Azilian culture completely differs from the Magdalenian, being characterised by the use of many microliths. There are flat harpoons made of the horn of red deer, and there are also many bone implements of indifferent workmanship. The most characteristic objects are flat pebbles painted with curious conventional designs. Some authorities believe them to be an early form of writing, others consider that they are conventionalised human and other forms and that they may be idols. The Azilians lived principally on shell fish, and vegetable food such as sloes, acorns, cherries, &c. Barley seeds have been found, but these were probably wild and are not proof that the Azilians were cultivators. The long barbed line already mentioned, some lines of dots, and a cross in a circle in the cave of Marsoulas are the only cave paintings attributed to the Azilians.

**EDUCATIONAL ENDOWMENTS (IRELAND) ACTS, 1885**  
(As amended by Section 3 of the Administrative Provisions Act (N.I.), 1928).

50

Dr.

**The Account of Belfast Natural History and Philosophical Society for the year ended 31st October, 1930.**

Cr.

RECEIPTS.		PAYMENTS.	
To Subscriptions	£126 19 0	By Balance as per last Account	£198 3 2
" Dividends	14 3 6	" Maintenance of Premises, &c.—Museum	101 3 6
" Rents	221 13 6	" Rent, Rates, and Taxes	30 10 11
" Miscellaneous Receipts, viz. :—		" Insurance	6 15 0
Archæology	£43 2 8	" Salaries and Wages	51 0 0
Bonamarghy	51 0 0	" Educational Expenses—Advertising	15 16 0
Centenary Volumes	0 4 0	" Printing and Stationery	52 9 5
Income Tax Refund	45 13 0	" Postages	11 10 0
" Balance against Account on 31st October, 1930	139 19 8	" Other Payments, viz. :—	
	36 13 7	Archæology	£27 15 3
		H. and P. Stamps	1 3 4
		Lantern Slides	9 4 11
		Audit Fee	1 1 0
		Bank Charges	0 10 6
		Bank Interest	7 8 5
		Income Tax	5 0 0
			52 3 5
York Street Flax Spinning Co. 4½% Debentures	£400 0 0	Total	£539 9 3

We certify that the above is a true Account.

E. J. ELLIOTT, Governor.  
W. B. BURROWES, Accounting Officer.  
12th day of December, 1930.

I certify that the foregoing Account is correct.

W. R. MACONKEY,  
Comptroller and Auditor-General.  
9th day of January, 1931.

Dr.	In Account with the Belfast Natural History and Philosophical Society—Archæological Section.				Cr.
To Balance, Nov. 1, 1929	...	£106	0	8	£9 9 0
" Subscriptions, 1930	...	42	7	8	11 11 6
" " Bonamarghy	...	51	0	0	1 0 0
" Subsidy	...	15	10	0	2 0 3
					3 14 6
					187 3 1
					£214 18 4
					£214 18 4

By Secretarial Expenses, Dec. 31, 1929

" R. Carswell &amp; Son, Ltd.

" A. R. Hogg

" T. E. Osborne

" James Lowry, Nendrum, April 29, 1930

" Balance

## EXCHANGES.

- ABO—Publications of the Abo Academy.  
 ALBANY—Bulletin of the New York State Museum.  
 ANN ARBOR—Publications of the University of Michigan.  
 AUCKLAND—Records of the Auckland Institute and Museum.  
 BASEL—Verhandlungen der Naturforschenden Gesellschaft  
           in Basel 1928-29.  
 BERGEN—Publications of the Bergen Museum.  
 BERKELEY—Publications of the University of California.  
 BIRMINGHAM—Publications of the Birmingham Natural  
                   History and Philosophical Society.  
 BOLOGNA—Publications of the Royal Academy of Science  
                   of Bologna.  
 BOSTON—Publications of the Boston Society of Natural  
                   History.  
 BOULDER—Bulletin of the University of Colorado.  
 BRIGHTON—Annual Report of the Brighton and Hove  
                   Natural History and Philosophical  
                   Society, 1929.  
 BRUSSELS—Publications of the Royal Zoological Society of  
                   Belgium.  
 BUFFALO—Publications of the Buffalo Society of Natural  
                   Science.  
 CALCUTTA—Publications of the Geological Survey of India.  
 CAMBRIDGE, MASS—Publications of the Museum of Com-  
                           parative Zoology.  
 CARDIFF—Transactions of the Cardiff Naturalists' Society.  
 CHICAGO—Publications of the Field Museum of Natural  
                   History.  
       ,,      Publications of the Chicago Academy of Sciences.  
       ,,      Annual Report of the John Crerar Library, 1929.  
 COIMBRA—Memoirs of the Zoological Museum of the Uni-  
                   versity of Coimbra.  
 COLORADO SPRINGS—Publications of the Colorado College.  
 COLUMBUS—Ohio Journal of Science.  
 DUBLIN—Proceedings of the Royal Dublin Society.  
 EDINBURGH—Proceedings of the Royal Physical Society.  
       ,,      Proceedings of the Royal Society of Edinburgh.  
       ,,      Transactions and Proceedings of the Botanical  
                   Society of Edinburgh.



- GORLITZ—Publications of the Natural History Society of Gorlitz.
- HALIFAX, N.S.—Proceedings and Transactions of the Nova Scotian Institute of Science.
- INDIANAPOLIS—Proceedings of the Indiana Academy of Science.
- LAUSANNE—Memoirs and Bulletins de la Societe Vaudoise des Sciences Naturelles.
- LAWRENCE—Bulletins of the University of Kansas.
- LEIPZIG—Publications of the Grassi Museum.
- LONDON—Quarterly Journal of the Royal Microscopical Society.
- „ Publications of the British Association.
- „ Proceedings of the Royal Institute of Great Britain.
- „ Quarterly Journal of the Geological Society.
- „ Publications of the Viking Society of Northern Research.
- „ Report of the National Trust, 1929-30.
- MADISON—Bulletin of the Wisconsin Geological and Natural History Survey.
- MELBOURNE—Proceedings of the Royal Society of Victoria.
- MILWAUKEE—Publications of the Public Museum of Milwaukee.
- MONTEVIDEO—Archivos de la Sociedad de Biologia de Montevideo.
- NEW HAVEN—Transactions of the Connecticut Academy of Arts and Sciences.
- NEW ORLEANS—Report of the Louisiana State Museum.
- NEW YORK—Annals of the New York Academy of Sciences.
- OSLO—Publications of the Norwegian Academy of Sciences.
- OTTAWA—Publications of the Geological Survey of Canada, Department of Mines.
- „ Publications of the Canadian Dept. of Agriculture.
- PADOVA—Publications of the Scientific Academy of the Royal University.
- PHILADELPHIA—Proceedings of the American Philosophical Society.
- „ Publications of the Academy of Natural Sciences.
- PULLMAN—Research Studies of the State College of Washington.

RENNES—Bulletin de la Societe Geologique.

RIO DE JANEIRO—Publications of the National Museum of Brazil.

„ Publications of the Oswaldo Cruz Institute.

ROCHESTER, N.Y.—Proceedings of the Rochester Academy of Science.

SAN DIEGO—Transactions of the San Diego Society of Natural History.

SAN FRANCISCO—Proceedings of the California Academy of Sciences.

ST. LOUIS—Public Library Monthly Bulletin.

STRATFORD—The Essex Naturalist.

SWANSEA—Proceedings of the Swansea Scientific and Field Naturalist Society.

SYDNEY—Annual Report of the Technological Museum, 1929

TORONTO—Transactions of the Royal Canadian Institute.

TORQUAY—Transactions and Proceedings of the Torquay Natural History Society.

UPSALA—Bulletin of the Geological Institution of the University of Upsala.

VIENNA—Publications of the Society of Zoology and Botany in Vienna.

WASHINGTON—Yearbook of the United States Department of Agriculture, 1930.

„ Annual Report of the Smithsonian Institution.

„ Annual Report and Bulletins of the United States National Museum.

„ Publications of the Bureau of American Ethnology.

„ Bulletins of the Smithsonian Institution.

„ Proceedings of the United States National Museum.

„ Smithsonian Institution, Miscellaneous Collections.

„ Publications of the United States Geological Survey.

YORK—Annual Report of the Yorkshire Philosophical Society, 1929.

ZURICH—Publications of the Natural History Society of Zurich.

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Fulton, G. F., Arlington, Windsor Avenue,	Belfast
aGaffikin, Miss Mary, 21 Deramore Drive,	do.
Garrod, Geoffrey, M.A., B.L., Maryville, Malone Road,	do.
Geale, R. G., 40 Wellington Park,	do.
Gemmell, Hugh, 41 Albertbridge Road,	do.
*Getty, Edmund (Representative of),	do.
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Gibson, Andrew, F.R.S.A.I., Fairfield, Lansdowne Road,	do.
Gibson, W. K., 44 Upper Arthur Street,	do.
aGillmour, J. W., Knocknarea, Kensington Road,	Knock
Goldsbrough, J. B., F.L.A., Central Public Library,	Belfast
Gordon, J. S., D.Sc., Ministry of Agriculture,	do.
Gordon, Malcolm, Dunarnon, University Road,	do.
Grainger, Robert, The Beeches,	Holywood
Green, H. Percy, Limehurst, Holland Park,	Belfast
aGreeves, Arthur, Altona, Strandtown,	do.
aGreeves, F. M., Garranard, Strandtown,	do.
aGreeves, John Theo., Nendrum, Knockdene Park,	do.
aGreeves, W. Leopold, 11 Ormeau Avenue,	do.
Greeves, Owden V., Collin House,	Dunmurry
Harris, Miss S. M., 25 Hartington Street,	Belfast
aHall, Alderman D. Lyle, 79 Cliftonville Road,	do.
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*Herdman, Robert Ernest, D.L., J.P., 1 May Street,	Belfast
aHeron, F. Adens, D.L., J.P., F.R.S.A.I., Maryfield,	Hollywood
aHewton, John, M.P.S.I., 315 Ormeau Road,	Belfast
aHill, Mrs. Elliot, Fairholme Cottage,	Helen's Bay
Hind, John, 22 Cliftonville Road,	Belfast
aHodgson, Lionel C., M.A., 59 Wellington Park,	do.
aHodgson, Mrs., 59 Wellington Park,	do.
aHogg, A. R., 10 Thorndale Avenue,	do.
Holland, F. J., 10 Academy Street,	do.
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aJennings, V. G., Wellcroft, Sandown Road,	Knock
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Kirkpatrick, Wm. Hollins, 20 Derryvolgie Avenue,	do.
Kyle, Robert Alexander, 15 Wellington Park,	do.
aLamb, G. C., Leura, Finaghy,	do.
Larmor, J. F., Beech Hill, near Lisburn,	Co. Antrim
aLawlor, H. C., M.A., M.R.I.A., 14 Windsor Avenue,	Belfast
aLawlor, Mrs. H. C., 14 Windsor Avenue,	do.
aLepper, R. S., M.A., F.R.HIST.S., LL.M., F.R.S.A.I., Elsinore,	Crawfordsburn, Co. Down.
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aLoewenthal, John McC., Lennoxvale, Malone Road,	do.
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aLondonderry, The Marchioness of, D.B.E., J.P., Mount Stewart,	do.
Loughridge, James S., M.D., F.R.C.S. (ENG.), 52 Elmwood Avenue,	Belfast
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aMackie, James, D.L., J.P., Albert Foundry,	Belfast
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Malcomson, Herbert T., M.B.O.U., 32 Arthur Street,	Belfast
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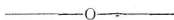
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- \*Young, Capt. J. R., Rathvarna, Chichester Park, do.

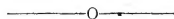
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